

Display Solid-state Pressure Switch with IO-Link

Catalog Numbers 836P-D1x, 836P-D2x

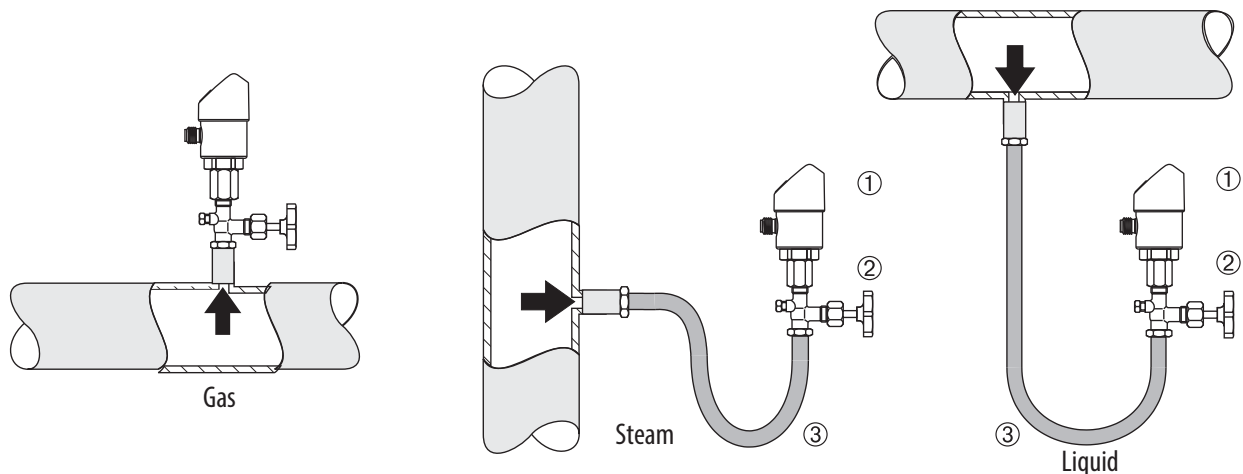
Safety Considerations

- Read this document for information on installation, handling, mounting, general product specifications, and operation of this product. These installation instructions contain important information on handling the instrument.
- Working safety requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the range of use of the instrument.
- The installation instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time.
- Skilled personnel must have carefully read and understood the operating instructions before any work begins.
- The Bulletin 836P-D is a pressure switch for measuring and monitoring absolute and gauge pressures. The device has been safely built with state-of-the-art technology and meets the applicable requirements and EC directives. It can, however, be a source of danger if used incorrectly or for anything other than the designated use.
- Qualified individuals are required for installation and commissioning. Failure to comply will result in personal injury or equipment damage.
- Before installation, commissioning and operation, be sure that the appropriate pressure switch has been selected in terms of measuring range, design, and specific measuring conditions.

Qualified Personnel

Qualified personnel are understood to be personnel who, based on their technical training, knowledge of measurement and control technology, and on their experience and knowledge of the country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognizing potential hazards.

Recommended Installation for Optimal Performance



Specifications

Certifications	cULus, safety (eg. Electr.safety overpressure, ...), USA, Canada CE conformity - Pressure equipment directive 97/23/EC EMC directive 2004/108/EC/EN 61326 emission (group 1, class B) and interference immunity (industrial application) RoHs conformity - 2011/65/EU
Environment: Operating Conditions	
Ambient Temperature Range [C (F)]	-20...80 ° (-4...+176 °)
Media [C (F)]	-20...85 ° (-4...+185 °)
Storage Temperature [C (F)]	-20...80 ° (-4...+176 °)
Vibration Resistance	10 g (0.35 oz) (IEC 60068-2-6, under resonance)
Shock Resistance	50 g (1.76 oz) (IEC 60068-2-27, mechanical)
Humidity	45...75 % r. h.
Ingress protection	IP65 and IP67. The stated ingress protection (per IEC 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.
Overpressure Limit	2 times. 1.7 times for the relative pressure measuring ranges 16 psi, 1,000 psi, and 1,500 psi
Electrical	
Power Supply	15...35 V DC
Current Consumption	Switching outputs with: Analog signal 4...20 mA; 70 mA; Without analog signal: 45 mA
Total Current Consumption	With IO-Link: maximum 450 mA including switching current
Outputs	
Output Type	2 x PNP, 1 PNP and 4...20 mA analog
Zero Offset Adjustment	Maximum 3% of span
Output Thresholds	OUT 1 and OUT 2 are individually adjustable
Output Modes	Selectable - Normally open, normally closed, window, hysteresis
Output Voltage	(Power Supply -1V)
Output Current	With IO-Link: OUT1 maximum 100 mA, OUT2 maximum 250 mA
Load	Analog signal 4...20 mA: $\leq 0.5 \text{ k}\Omega$
Service Life	100 million switching cycles
Settling Time	Analog Signal: 3 ms Switching Output: 20 ms with IO-Link
Accuracy Data	
Analog Signal	$\leq \pm 1.0\%$ of span Including non-linearity, hysteresis, zero offset, and end value deviation (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards.
Non-linearity	$\leq \pm 0.5\%$ of span (BFSL, IEC 61298-2)
Long-term Drift	$\leq \pm 0.2\%$ of span (IEC 61298-2)
Switching Output	Switch point accuracy: $\leq \pm 1\%$ of span; Adjustment accuracy: $\leq \pm 0.5\%$ of span
Display	$\leq \pm 1.0\%$ of span ± 1 digit
Temperature Error in Rate Temperature Range	Typical: $\leq \pm 1.0\%$ of span; Maximum: $\leq \pm 2.5\%$ of span
Temperature Coefficients in Rated Temperature Range	Mean TC zero point: $\leq \pm 0.2\%$ of span/10 K (typical); Mean TC span: $\leq \pm 0.1\%$ of span/10 K (typical)
Reference Operation Conditions	
Operating Temperature [C (F)]	15...25 ° (59...77 °)
Atmospheric Pressure	950...1,050 mbar (13.78...15.23 psi)
Humidity	45...75 % r. h.
Nominal Position	Process connection lower mount (LM)

Specifications (continued)

Electrical Safety	
Short-circuit Protection	4...20 mA, Out 1/Out 2 vs. V-
Reverse Polarity Protection	V+ vs. V-
Insulation Voltage	500V DC
Overvoltage Protection	40V DC
Material	
Wetted Parts	
Process Connection	Stainless Steel 316L
Pressure Sensing Elements	< 9.8 bar (142 psi): Stainless Steel 316L ≥ 9.8 bar (42 psi): Stainless Steel 13-8 PH
Non-wetted Parts	
Housing	Stainless Steel 304
Keyboard	TPE-E
Display Window	Polycarbonate
Display Head	Polycarbonate and ABS
Process Connection	
Thread	1/4 in. NPT Male 1/4 in. NPT Female G 1/4 in. BSPP Male G 1/4 in. BSPP Female

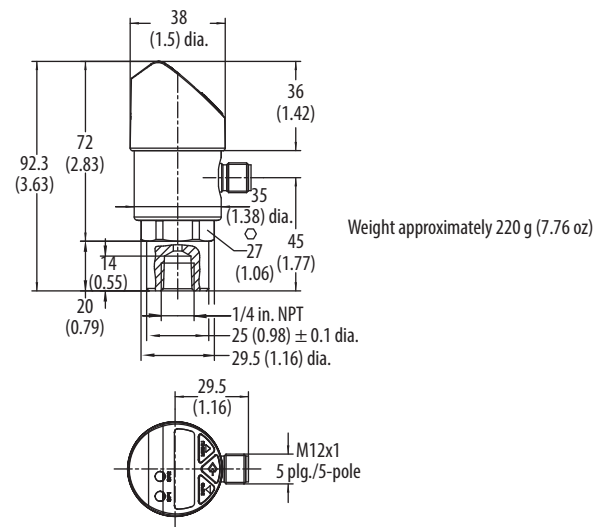
IO-Link Specifications

IO-Link Protocol: Version 1.1
 Minimum Cycle Time: 3 ms
 Rate: COM2 (38.4 k Baud)
 Process Data Length: 16 bit (Frame 2.2)
 Data Storage Support: Yes

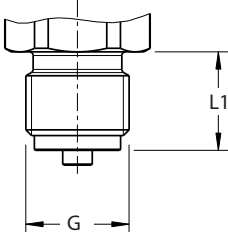
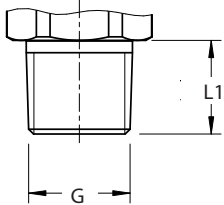
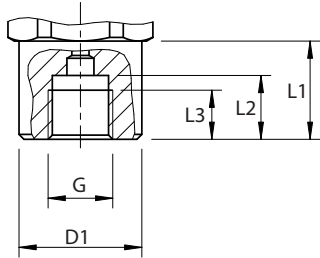
Process Connection

Attribute	Description
Measuring Cell	Piezoresistive measuring cell and metallic measuring diaphragm
Application	Measurement and monitoring of absolute and gauge pressures
Process Connection	Thread – 1/4 in. NPT female – 1/4 in. NPT male – G 1/4 in. BSPP female – G 1/4 in. BSPP male

1/4 in. NPT Female Dimensions [mm (in.)]

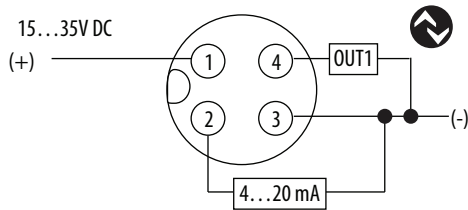


Process Connection [mm (in.)]

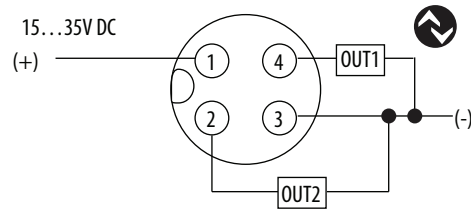
G 1/4 in. BSPP Male		1/4 in. NPT Male		G 1/4 in. BSPP Female				
								
G	L1 [mm (in.)]	G	L1 [mm (in.)]	G	L1	L2	L3	D1
G 1/4	13 (0.51)	1/4 in. NPT	13 (0.51)	G 1/4 in.	20 (0.79)	13 (0.51)	10 (0.39)	25 (0.98)

Wiring Diagrams

1 PNP x 4...20 mA



2 PNP



IMPORTANT IO-Link operation is only available when connected to an IO-Link Master such as the 1734-4IOL or any competitive IO-Link Master. While in Standard IO mode (SIO), the sensor operates as a discrete PNP output.

Mating Cables

889D – F4AC-2 (M12x1 connector).

889D-R4AC-2 (M12x1 right angle connector).

Measuring Ranges

Gauge Pressure											
bar	0...1	0...1.4	0...2	0...2.5	0...4	0...6	0...9	0...13	0...17	0...20	
psi	0...14.5	0...20	0...30	0...36.2	0...60	0...100	0...145	0...200	0...250	0...300	
bar	0...24	0...34	0...68	0...99	0...137	0...206	0...248	0...344	0...399	0...551	
psi	0...362	0...500	0...1,000	0...1,450	0...2,000	0...3,000	0...3,600	0...5,000	0...5,800	0...8,000	
Absolute Pressure											
bar	0...1	0...1.4	0...2	0...2.5	0...4	0...6	0...10	0...13	0...17	0...20	
psi	0...14.5	0...20	0...30	0...36.2	0...60	0...100	0...145	0...200	0...250	0...300	
Vacuum and ± Measuring Range											
bar	-1...1	-1...1.4	-1...2	-1...2.5	-1...4	-1...6	-1...9	-1...13	-1...17	-1...20	
psi	-14.5...14.5	-14.5...20	-14.5...30	-14.5...36.2	-14.5...60	-14.5...100	-14.5...145	-14.5...200	-14.5...250	-14.5...300	

Note: Overpressure Limit 2 times; 1.7 times for the relative pressure measuring ranges 160 psi, 1000 psi, and 1,500 psi.

Output Signals

Output Model Type	Switching Output 1	Switching Output 2	Analog Signal
1 PNP x 4...20 mA	PNP	-	4...20 mA (3 wire)
2 PNP	PNP	PNP	-

Commissioning



ATTENTION: Only for use with the pressure switch if it is in perfect condition with respect to safety.

Check the following points before commissioning:

- Leaking fluid is indicative of damage.
- Since this is a safety-relevant component, check the diaphragm for any visible damage.

Required tool: Spanner size 27 open-ended spanner and screwdriver.

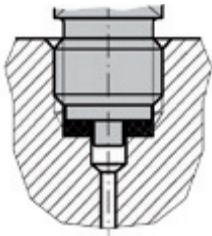
Making the Mechanical Connection

- While mounting, make sure that the sealing faces at the instrument are clean and undamaged.
- Only screw in or unscrew the instrument via the spanner flats. Never use the case as a working surface.
- The correct torque depends on the dimensions of the process connection and the gasket used (form/material).
- When screwing in, be careful to not cross the threads.

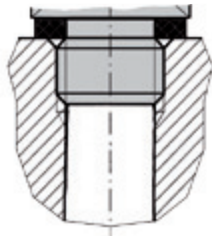
Types of Sealing

Figure 1 - Parallel Thread

per EN 837

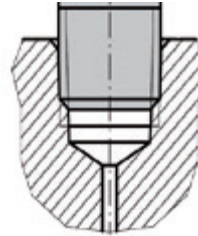


per DIN 3852-E



Tapered Thread (NPT)

NPT



Correct sealing of the process connections with parallel threads at the sealing face must be made using suitable flat gaskets and sealing rings.

The sealing of the tapered threads (for example, NPT thread) is made by providing the thread with additional sealing material such as, for example, PTFE tape (EN 837-2).

Making the Electrical Connection

- The instrument must be earthed via the process connection.
- The power supply for the pressure switch must be made via an energy-limited electrical circuit in accordance with section 9.3 of UL/EN/IEC 61010-1 or an LPS to UL/EN/IEC 60950-1 or class 2 in accordance with UL1310/UL1585 (NEC or CEC). The power supply must be suitable for operation above 2,000 m (6,561.6 ft) should the pressure switch be used at this altitude.
- For cable outlets, make sure that no moisture enters at the cable end.

Dismounting and Disposal



ATTENTION: Residual media in the dismantled pressure transmitter can result in a risk to persons, the environment, and equipment. Take sufficient precautionary measures.

Dismounting: Only disconnect the pressure transmitter once the system has been depressurized.

Disposal: Incorrect disposal can put the environment at risk.

Dispose of instrument and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

Programming

Keys and Functions

Status switching output2 (optional)

Status switching output1

Display mode

- Short press
Display of the unit
- Long press
Display of the set parameters

Programming mode

- Short press
Menu up
Parameter value up (step-wise)
- Long press
Menu up
Parameter value up (fast)

Note: The pressure switch has two operating modes, the display mode and the programming mode. The function of the keys depends on the selected operating mode.

Enter key: In programming mode, press the enter key once to set the values for the selected parameters.

4-digit LED display

- Display pressure value
- Display menu item
- Display parameter

Display mode

- Short press
Display of the unit
- Long press
Enter the programming mode

Programming mode

- Short press (equals three seconds)
Menu up
Parameter value up (step-wise)
- Long press (equals five seconds)
Menu down
Parameter value down (fast)

Display mode

- Short press
Display of the unit

Programming mode

- Short press
Select menu item
Confirmation of the input

Note: Short press equals three seconds; long press equals five seconds.

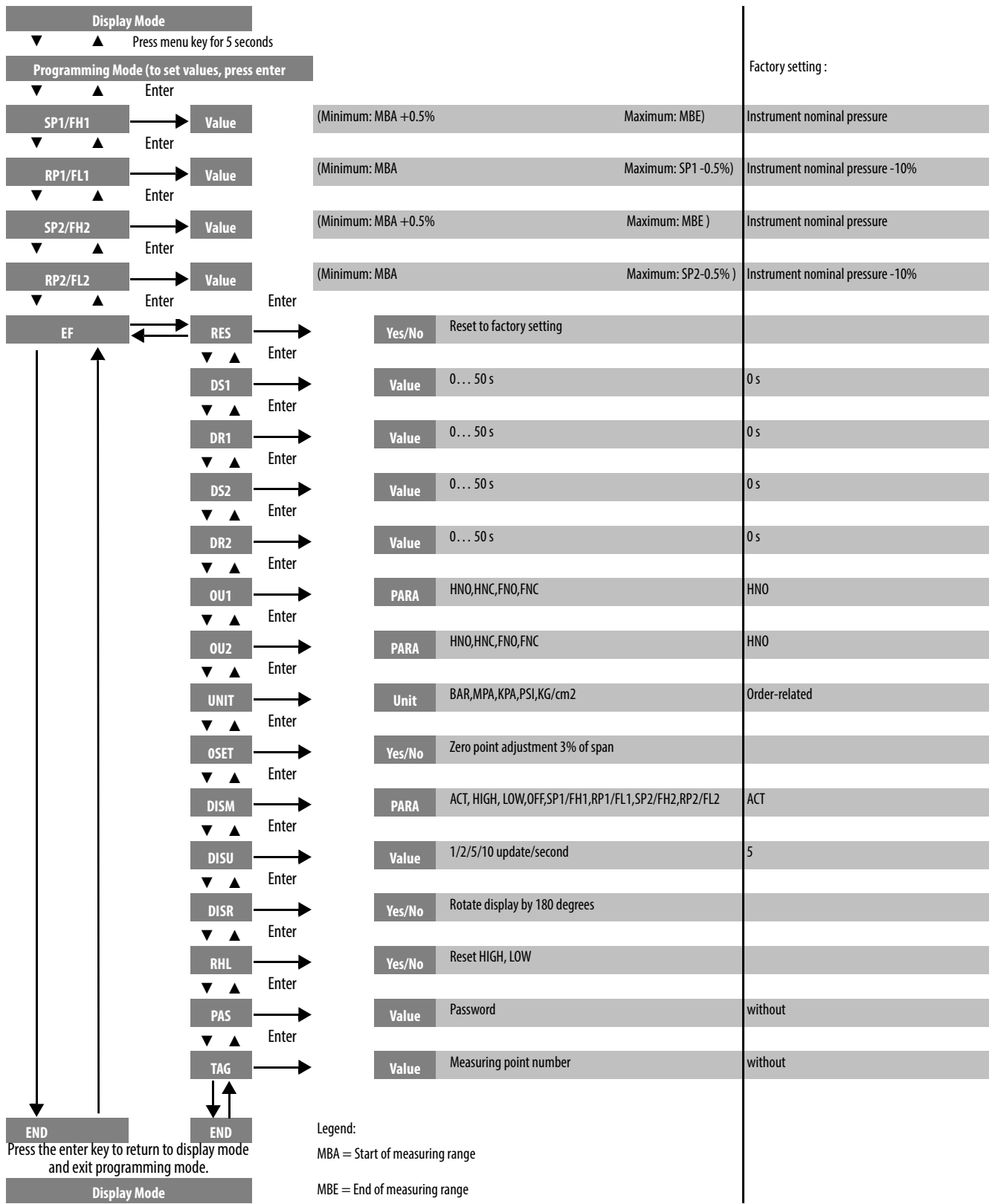
Keys (Simultaneously pressing the info and menu keys exits the programming mode and returns to display mode.)	Function	
	Display Mode	Programming Mode (Press the menu key for five seconds to enter programming mode.)
	Short Press: • Display of the unit Long Press: • Display of set parameters	Short press: toggle parameter up (step-wise)
	Short Press: • Display of the unit Long Press: • Enters programming mode	Short press: toggle parameter down (step-wise)

Parameters

Parameter	Description
SP1/SP2	Hysteresis function: Switch point switching output (1 or 2)
FH1/FH2	Window function: Window high switching output (1 or 2)
RP1/RP2	Hysteresis function: reset point switching output (1 or 2)
FL1/FL2	Window function: Window low switch output (1 or 2)
EF	Extended programming functions
RES	Return the set parameter to the factory settings
DS1/DS2	Switch delay time, which must occur without interruption before any electrical signal change occurs (SP1 or SP2)
DR1/DR2	Switch delay time, which must occur without interruption before any electrical signal change occurs (RP1 or RP2)
OU1	Switching function switching output (1 or 2)
OU2	HNO = hysteresis function, normally open HNC = hysteresis function, normally closed FNO = window function, normally open FNC = window function, normally closed

Parameter	Description
UNIT	Unit switching
OSET	Offset adjustment (3% of span)
DISM	Display value in display mode CT= actual pressure value; LOW, HIGH = minimum, maximum pressure value OFF= display off; SP1/FH1 = function switch point 1, RP1/FL1 = function reset point 1, SP2/FH2= function switch point 2, RP2/FL2 = function reset point 2
DISU	Display update 1,2,5,10 updates/second
DISR	Rotate display indicator by 180 degrees
RHL	Clear the minimum- and maximum - value memories
PAS	Password input, 0000= no password Password input digit by digit
TAG	Input of a 16-figure alphanumeric measuring point number

Menu (programming and factory setting)



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In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit

<http://www.rockwellautomation.com/services/online-phone>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada 1.440.646.3434

Outside United States or Canada Use the [Worldwide Locator](#) at <http://www.rockwellautomation.com/rockwellautomation/support/overview.page>, or contact your local Rockwell Automation representative.

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